

Claims

1. A tensioner for deploying an elongate member comprising:
 - i) an endless track including a plurality of traction elements, each traction
5 element comprising a base unit including at least a first gripping surface and first moveable arm and a second arm each including a further gripping surface, the arms being mounted at respective sides of the traction element and the first arm being operatively moveable about a pivot axis between a first position in which the further gripping surface of said first arm is spaced
10 from the member and a second position in which said further gripping surface of said first arm can contact the member;
 - ii) drive means for driving the track so that the traction elements move along an endless path, said endless path including a path segment along which said first gripping surfaces operatively contact the member;
 - 15 iii) first guide means which operatively co-operates with the first arm to urge the first arm from said first position to said second position such that the first arm maintains said second position as the traction elements move along said path segment; and
 - iv) second guide means which operatively co-operates with said second arm to
20 form, in said path segment, a reaction surface for a reaction force substantially normal to said surface and to the longitudinal axis of the member.
2. A tensioner as claimed in claim 1 wherein the second arm is also operatively
25 moveable about a pivot axis between a first position in which the further gripping surface of said second arm is spaced from the member and a second position in which said further gripping surface of said second arm can contact the member and said second guide means operatively co-operates with the second arm to urge the second arm from said first position to said second position such that the
30 second arm maintains said second position as the traction elements move along said path segment.

3. A tensioner as claimed in claim 1 or 2 wherein in said path segment, the pivot axis of the or each arm is operatively substantially aligned with the longitudinal axis of the member.
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4. A tensioner as claimed in claim 1 or claim 3 when dependent on claim 1 wherein the first guide means presents a guide surface operatively co-operating with a contacting surface of the first arm, the guide surface extending generally longitudinally with respect to the member and being so shaped in a portion preceding said path segment to move said first arm from the first position to the second position and in a portion succeeding said path section to allow the first arm to move from said second position to said first position.
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5. A tensioner as claimed in claim 2 or claim 3 when dependent on claim 2 wherein the guide means present respective first and second guide surfaces operatively co-operating with a contacting surface of said respective arms, the guide surfaces extending generally longitudinally with respect to the member and being so shaped in a portion preceding said path segment to move said arms from the first position to the second position and in a portion succeeding said path section to allow the arms to move from said second position to said first position.
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6. A tensioner as claimed in claim 5 wherein the first and second guide surfaces are defined on first and second guide rails.
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7. A tensioner as claimed in any of claims 4 to 6 wherein the contacting surfaces of the or each arm comprises a surface of a roller mounted on the arm for rotation about an axis substantially perpendicular to the pivot axis of the first arm.
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8. A tensioner as claimed in any preceding claim wherein the base unit comprises two first gripping surfaces such that when the arms are in their second position the four gripping surfaces are equidistantly spaced.
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9. A tensioner for deploying an elongate member comprising:
- i) an endless track including a plurality of traction elements, each traction element comprising:
 - 5 (a) a base unit;
 - (b) first and second arms mounted at respective opposite sides of the traction element and each including a gripping surface operatively disposed above the longitudinal axis of the member; and
 - (c) third and fourth arms also mounted at respective opposite sides of the traction
- 10 element and each including a gripping portion operatively disposed below the longitudinal axis of the member,
- each said arm being operatively moveable about a pivot axis between a first position in which the gripping surfaces are spaced from the member and a second position in which the gripping surfaces can contact the member;
- 15 ii) drive means for driving the track so that the traction elements move along an endless path, said endless path including a path segment along which said gripping surfaces operatively contact the member;
 - iii) guide means which operatively co-operates with the first and second arms to urge the first and second arms from said first position to said second position
- 20 such that the first and second arms maintain said second position as the traction elements move along said path segment; and
- iv) a first linkage connecting the first arm and the fourth arm and a second linkage connecting the second arm and the third arm such that movement of the first and second arms between their first and second positions causes a
- 25 corresponding movement of the third and fourth arms between their first and second positions.
10. A tensioner as claimed in claim 9 wherein in said path segment, the pivot axes of the arms are operatively substantially aligned with the longitudinal axis of the
- 30 member.

11. A tensioner as claimed in claim 9 or 10 wherein respectively the first and third arms and the second and fourth arms pivot about a common axis.
- 5 12. A tensioner as claimed in claim 11 wherein the common axes of the first and third and second and fourth arms, and the longitudinal axis of the member operatively lie in the same plane.
- 10 13. A tensioner as claimed in any of claims 9 to 12 wherein the first and third arms each include an extension portion extending below their pivot axis, and the first and second linkages comprises a link arm which is pivotally attached at a first end to a lower region of the extension portion of the respective first or second arm and which is pivotally attached at a second end to a lower portion of the third or fourth arm.
- 15 14. A tensioner as claimed in any of claims 9 to 13 wherein the guide means present respective first and second guide surfaces operatively co-operating with a contacting surface of said first and second arms, the guide surfaces extending generally longitudinally with respect to the member and being so shaped in a portion preceding said path segment to move said arms from the first position to
20 the second position and in a portion succeeding said path section to allow the arms to move from said second position to said first position.
- 25 15. A tensioner as claimed in claim 14 wherein the first and second guide surfaces are defined on first and second guide rails.
16. A tensioner as claimed in any of claims 14 or 15 wherein the contacting surfaces of the first and second arms comprise a surface of a roller mounted on the arm for rotation about an axis substantially perpendicular to the pivot axis of the arm

17. A tensioner as claimed in any of claims 9 to 16 wherein the gripping surfaces of the arms are, in use, equidistantly spaced about the circumference of the member in their second position.
- 5 18. A tensioner as claimed in any preceding claim wherein the endless track comprises first and second track belts operatively driven in unison and wherein each traction element includes first and second attachment wings extending laterally from the base unit and fixedly mounted on a respective track belt.
- 10 19. A tensioner as hereinbefore described with reference to any of Figures 1 to 8.